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EXAMINER	
ZHENG, LOIS L	
ART UNIT	**PAPER NUMBER**
1742	

DATE MAILED: 11/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/059,907	HANSON ET AL.	
	Examiner	Art Unit	
	Lois Zheng	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *26-38 and 42-90* is/are pending in the application.

4a) Of the above claim(s) *42-48 and 84-90* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26-38 and 49-83* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *21 June 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1-25 and 39-41 are canceled in view of the preliminary amendment filed 6 October 2004. New claims 62-90 are added in view of the preliminary amendment. Therefore, claims 26-38 and 42-90 are currently pending.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 26-38 and 49-83, drawn to an apparatus, classified in class 204, subclass 275.1.

II. Claims 42-48 and 84-90, drawn to a process, classified in class 205, subclass 261.

3. Inventions II and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially difference process such as an electroless plating process or an electrochemical planarization process.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with John Wechkin on 15 November 2005 a provisional election was made without traverse to prosecute the invention of I, claims 26-38 and 49-83. Affirmation of this election must be made by applicant in replying to this Office action. Claims 42-48 and 84-90 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Drawings

6. The drawing Fig. 1 is objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "165" has been used to designate both the space formed between the electrode housing assembly and the process cup assembly(specification, page 15, last paragraph) and a fluid outlet tube(specification, page 16 second full paragraph).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 71-72 and 78 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claims 71-72 recite the limitation "the chamber" in line 1 and 2 respectively. There is insufficient antecedent basis for this limitation in the claim.

Claim 78 recites the limitation "the electrode compartment" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 62-64, 66-71, 73-78 and 81-83 are rejected under 35 U.S.C. 102(e) as being anticipated by Reid et al. US 6,126,798(Reid).

Reid teaches an electroplating apparatus comprising a reactor vessel (Fig.2 numeral 54A) filled with processing fluid, a workpiece support(Fig. 1 numeral 32), an electrode(i.e. anode)(Fig. 2 numeral 206), a ring field shaping element(Fig. 2 numeral 314) and a membrane(Fig. 2 numeral 208) between the electrode and the ring field shaping element.

Regarding instant claim 62, the membrane in the electroplating apparatus of Reid has a porosity sufficient to allow plating solution to flow through(col. 6 lines 3-7). Therefore, Reid's membrane reads on the claimed diffuser. Reid's electroplating apparatus meets the instant claim limitations.

Regarding instant claims 68 and 77, the electrode(i.e. anode) compartment(Fig. 2 numeral 202) of Reid reads on the claimed electrode support. The remaining claim limitations are met by the teachings of Reid for the same reason as stated in the rejection of instant claim 62 above.

Regarding instant claims 63, 66 and 81-83, Reid further teaches the claimed electrode compartment(Fig. 2 numeral 202) located within the reactor vessel and the electrode (i.e. anode) is located within the electrode compartment).

Regarding instant claims 64, 67 and 78, since Reid further teaches that the membrane porosity is sufficient to allow ions to flow through the membrane(col. 5 lines 46-48), Reid's membrane read on the claimed ionic membrane located between the electrode and the ring field shaping element.

Regarding instant claim 69, the diffuser membrane of Reid is porous, therefore, includes a multitude of perforations as claimed.

Regarding instant claim 70, the diffuser of Reid is positioned above the electrode support and the ring field shaping element of Reid is positioned above the diffuser as claimed.

Regarding instant claim 71, the reactor vessel of Reid has a circular cross-sectional shape with a centrally located fluid inlet as claimed.

Regarding instant claim 73, Reid further teaches that one or more electrical contacts as claimed are connected to the outer edge of the wafer(Fig. 1, col. 4 lines 26-28).

Regarding instant claim 74, the opening of ring field shaping element is in alignment with the inner region of the wafer as claimed.

Regarding instant claim 75, the workpiece support from Reid is inherently capable of moving axially toward and away from the electrode support as claimed in order to load and unload the wafer workpiece before and after electroplating.

Regarding instant claim 76, Reid further teaches that the workpiece support is capable of rotating the wafer workpiece about the axis as claimed(col. 3 line 65 – col. 4 line 1).

12. Claims 62-63, 66, 68-72, 74-77 and 81-83 are rejected under 35 U.S.C. 102(e) as being anticipated by Uzoh et al. US 6,261,426 B1(Uzoh).

Uzoh teaches an electroplating apparatus comprising a reactor vessel (Fig.1 numeral 14) filled with processing fluid, an electrode(i.e. anode)(Fig. 1 numeral 4), a ring field shaping element(Fig. 1 numeral 10) and a diffuser(Fig. 2 numeral 8) between the electrode and the ring field shaping element.

Regarding instant claim 62, the claimed workpiece support is inherently present in the electroplating apparatus of Uzoh in order to rotate the workpiece during electroplating as taught by Uzoh(col. 4 lines 4-8). Therefore, Uzoh's electroplating apparatus meets the limitations of the instant claim.

Regarding instant claims 68 and 77, Uzoh further teaches an electrode(i.e. anode) compartment(Fig. 1) of Reid and supported by an electrode support member(Fig. 1 numeral 20), which reads on the claimed electrode support. The remaining claim limitations are met by the teachings of Uzoh for the same reason as stated in the rejection of instant claim 62 above.

Regarding instant claims 63, 66 and 81-83, Uzoh further teaches the claimed electrode compartment(Fig. 2 numeral 202) located within the reactor vessel and the electrode (i.e. anode) is located within the electrode compartment).

Regarding instant claim 69, Uzoh further teaches flow openings(Fig. 1 numerals 28 and 26) which reads on the claimed multitude of perforations.

Regarding instant claim 70, the diffuser of Uzoh is positioned above the electrode support and the ring field shaping element of Uzoh is positioned above the diffuser as claimed.

Regarding instant claim 71, the reactor vessel of Uzoh has a circular cross-sectional shape with a centrally located fluid inlet as claimed.

Regarding instant claim 72, Uzoh teaches the claimed fluid inlet directing the processing fluid radially outwardly in the reaction vessel(Fig. 1).

Regarding instant claim 74, the opening of ring field shaping element is in alignment with the inner region of the wafer as claimed.

Regarding instant claim 75, the workpiece support from Uzoh is inherently capable of moving axially toward and away from the electrode support as claimed in order to load and unload the wafer workpiece before and after electroplating.

Regarding instant claim 76, Uzoh further teaches that the workpiece support is capable of rotating the wafer workpiece about the axis as claimed(col. 4 lines 4-8).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claim 73 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh in view of Dordi et al. US 6,635,157 B2(Dordi).

The teachings of Uzoh are discussed in paragraph 12 above. However, Uzoh does not explicitly teach the claimed conductive member positioned to electrically contact the outer region of the workpiece.

Dordi teaches an electroplating apparatus comprising a reactor vessel(Fig. 6 numeral 440) and a workpiece holder comprising a contact ring(Fig. 7) in electrical contact with the outer peripheral of the workpiece(Fig. 12).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated workpiece contact ring of Dordi into the workpiece support of Uzoh in order to produce highly repeatable, consistent and uniform plating across the plating surface as taught by Dordi(col. 13 lines 16-21).

15. Claims 53-61, 64-65, 67 and 78-80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh in view of Reid.

The teachings of Uzoh are discussed in paragraph 12 above. However, Uzoh do not explicitly teach the claimed ionic membrane.

The teachings of Reid are discussed in paragraph 11 above.

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the anode assembly of Reid(Fig. 2 numeral 62A), including the ionic membrane(Fig. 2 numeral 208) and soluble anodes(Fig. 2 numeral 206), into the electroplating apparatus of Uzoh since Reid teaches that its soluble anode assembly effectively removes gas bubbles and improves plating uniformity(col. 1 lines 39-35, col. 5 line 65 – col. 6 line 2, col. 7 lines 41-55).

Regarding instant claim 53, Uzoh in view of Reid teach the claimed chamber(Uzoh, Fig.1 numeral 14) filled with processing fluid, the claimed at least one fluid inlet(Uzoh, Fig. 1 numeral 2), the claimed electrode support carrying an electrode(i.e. anode), the claimed permeable membrane(Reid, Fig. 2 numeral 208) and the claimed porous flow distribution element(i.e. diffuser) (Uzoh, Fig. 1 numeral 8) and the claimed shield(i.e. ring field shaping element)(Uzoh, Fig. 1 numeral 10). In addition, the claimed workpiece support is inherently present in the electroplating apparatus of Uzoh in order to rotate the workpiece during electroplating as taught by Uzoh(col. 4 lines 4-8). Therefore, the permeable membrane of Uzoh in view of Reid is positioned between the electrode support and the workpiece support as claimed. The porous flow distribution element of Uzoh in view of Reid is inherently positioned between the permeable membrane and the workpiece support as claimed. The shield of Uzoh in

view of Reid is positioned between the flow distribution element and the workpiece support as claimed.

Regarding instant claim 54, the ionic membrane of Uzoh in view of Reid is permeable to ionic species in the processing fluid as claimed.

Regarding instant claims 55 and 80, the ionic membrane of Uzoh in view of Reid is conical shape with the edge portion closer to the workpiece support as claimed(Reid, Fig. 2).

Regarding instant claim 56, the instant claim is rejected for the same reason as stated in the rejection of instant claim 69 above.

Regarding instant claims 57-58, the shield(i.e. ring field shaping element) of Uzoh in view of Reid comprises a rim and an opening disposed annularly inwardly from the rim as claimed.

Regarding instant claim 59, the semiconductor wafer substrate as taught by Uzoh in view of Reid reads on the claimed microelectronic workpiece.

Regarding instant claim 60, the claimed processing fluid is present in the reactor vessel of Uzoh in view of Reid.

Regarding instant claim 61, the electrode(i.e. anode) of Uzoh in view of Reid is carried by an electrode support as claimed.

Regarding instant claims 64-65, 67 and 78-79, the membrane of Uzoh in view of Reid meets the structural limitations of the instant claims.

Double Patenting

16. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the

unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

17. Claims 26-38 and 49-52 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-33 of U.S. Patent No. 6,368,475 B1. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1-33 of U.S. Patent No. 6,368,475 B1 teaches an electrochemical processing apparatus comprising a reactor vessel, a pressure drop member, and two fluid flow regions with the workpiece in one of the fluid flow region and the anode in the other fluid flow region.

18. Claims 53-83 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-33 of U.S. Patent No. 6,368,475 B1 in view of Uzoh. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1-33 of U.S. Patent No. 6,368,475 B1 teaches an electrochemical processing apparatus comprising a reactor vessel, a

pressure drop member, and two fluid flow regions with the workpiece in one of the fluid flow region and the anode in the other fluid flow region.

However, the claims of U.S. Patent No. 6,368,475 B1 do not explicitly teach the claimed diffuser and the claimed ring field shaping element.

The teachings of Uzoh are discussed in paragraghs 12 and 14 above. Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the diffuser and the ring field shaping element of Uzoh into the electrochemical processing apparatus of U.S. Patent No. 6,368,475 B1 in order to produce more uniform electroetched or electroplated films as taught by Uzoh(col. 2 lines 57-67).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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